

An Overview of the *SEER Cancer Statistics Review*

The National Cancer Institute (NCI) updates cancer statistics annually in a publication called the *SEER Cancer Statistics Review* (CSR). This report summarizes the key measures of cancer's impact on the U.S. population. NCI monitors these cancer statistics to assess progress and to identify population subgroups and geographic areas where cancer control efforts need to be concentrated.

The *SEER Cancer Statistics Review* consists of a series of publications that have been produced annually by the Surveillance, Epidemiology, and End Results (SEER) Program in NCI's Division of Cancer Control and Population Sciences. Data included in the books are compiled by the SEER Program, which has monitored occurrence of cancer and survival of patients since 1973 in 10 percent of the U.S. population.

The tables, charts, and graphs of the *SEER Cancer Statistics Review* present cancer incidence rates (the number of cases per 100,000 persons), cancer mortality rates (the number of deaths per 100,000 persons), and 5-year relative survival rates (this 5-year survival data estimates only the patients' risk of dying from cancer-related causes, and not from other illnesses).

Data are given for all major cancer sites by age, sex, and race (all races, whites, blacks, and Hispanics). Cancer incidence and survival data are collected by the SEER Program, while

mortality data come from the National Center for Health Statistics (NCHS). The reports also provide data on trends in cancer incidence and mortality rates, American Cancer Society estimates of new cancer cases and cancer deaths, and measures of the years of life lost prematurely by those dying of cancer.

These books contain estimates of the lifetime probabilities of developing cancer and probabilities of dying of cancer. These probabilities are presented by race, sex, and cancer site. In addition, probabilities of developing cancer up to a specific age are also included.

The SEER Web page provides an online version of the CSR that may be viewed on computers equipped with Adobe Acrobat Reader software. To access this version of the report, go to the SEER Web page (<http://www-seer.ims.nci.nih.gov>) and then click on “Publications,” which will yield a list of options including the most recent CSR. Single print copies of the most recent edition of the *SEER Cancer Statistics Review* may be obtained by writing the Office of Cancer Communications, National Cancer Institute, 31 Center Drive MSC 2580, Building 31, Room 10A16, Bethesda, MD 20892–2580, or calling the NCI’s Cancer Information Service at 1–800–4–CANCER (1–800–422–6237).

Questions and Answers About the *SEER Cancer Statistics Review*

DESCRIPTION OF THE *SEER CANCER STATISTICS REVIEW* (CSR)

1. What is the *SEER Cancer Statistics Review*?

The CSR is a database published annually in electronic and paperback formats by the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute (NCI). It provides data on cancer incidence, mortality, and patient survival for more than 20 different cancers and for all cancers combined. Cancer incidence and survival data from nine geographic areas representing about 10 percent of the U.S. population are used in the book, along with mortality data from the entire United States. Data are reported by cancer site, age, time period, sex, and race (all races, whites, and blacks). Additional data are presented from registries added to the SEER Program in 1992. These registries increased coverage of minority populations.

2. What is the purpose of the CSR?

The CSR reports and summarizes the key measures of cancer's impact on the U.S. population. The primary statistics reported are the rate at which new cases occur (incidence), the rate of death from cancer (mortality), and the percentage of patients surviving at various points in time after diagnosis.

3. How can the CSR be used?

The CSR provides a cancer data resource for a variety of scientific, educational, business, and governmental activities. It is used by national, state, and local health agencies to help identify cancer problems. Data from the CSR are used to plan, implement, and evaluate cancer control efforts, and to design population-based research studies.

Researchers use the CSR as the primary assessment of cancer status in the United States. Besides serving as a valuable reference, the CSR data provide a statistical baseline for comparison with investigational findings.

The SEER data have been linked with information from other agencies to address cancer-related issues. For example, demographic information was linked to census data on socioeconomic status which showed that, for some cancers, socioeconomic status is more important than race in explaining differences in incidence. Also, SEER data linked to Medicare records at the Health Care Financing Administration are being used to help assess the costs of cancer tests and treatment by site and stage.

4. How has the CSR changed over time?

Each year's edition of the CSR differs from the last by the addition of a single year's statistics to the SEER database. New additions include incidence, mortality, survival, prevalence, and probability of developing and dying from cancer data for the most recent years for which complete data are available.

BACKGROUND AND RESOURCES

5. Who prepares the CSR?

The CSR is prepared by NCI statisticians in the Cancer Surveillance Research Program (CSRP), Division of Cancer Control and Population Sciences. NCI is part of the National Institutes of Health, U.S. Department of Health and Human Services.

6. What is the Surveillance, Epidemiology, and End Results (SEER) Program?

The SEER Program, started in 1973, is NCI's main tool for tracking, assembling, and reporting data on cancer incidence, mortality, and survival in the United States. Data currently come primarily from population-based cancer registries in nine geographic areas across the country. Data are collected by age, sex, and race (all races, whites, and blacks). National trends in cancer incidence and patient survival are derived from this database. Mortality statistics come from the National Center for Health Statistics (NCHS).

The SEER Program was expanded in the early 1990s to increase coverage of minority populations, especially Hispanics. The two areas which were added are in California: Los Angeles County and the four counties in the San Jose-Monterey area south of San Francisco.

Data from the report, and from SEER special studies, are used by NCI and others to design specific research studies to investigate causal factors. Examples of such research include epidemiologic studies designed to test dietary or hormonal hypotheses suggested by observed incidence and mortality patterns by age, race, sex, geographic area, and ecologic variables such as socioeconomic status. SEER data are also used by NCI and others to guide program decisions in cancer prevention and control. NCI has used these data to create special programs aimed at breast, prostate, and lung cancers, and to target cancer prevention and control programs at population groups with high incidence or mortality rates.

7. What is a cancer registry?

A cancer registry (sometimes known as a tumor registry) collects and stores data on cancers diagnosed either in a specific hospital or medical facility (hospital-based registry)

or in a defined geographic area (population-based registry). A population-based registry is generally composed of a number of hospital-based registries.

Registries participating in the SEER Program are population-based.

8. Which SEER cancer registries contribute data to the CSR?

Cancer incidence data presented since 1973 in the CSR come from nine SEER geographic areas that maintain population-based cancer registries in four metropolitan areas and five states across the United States. The registries cover Atlanta, Georgia (five counties); Detroit, Michigan (three counties); San Francisco-Oakland, California (five counties); Seattle-Puget Sound, Washington (13 counties); and all counties in Connecticut, Hawaii, Iowa, New Mexico, and Utah. Data are also presented for the two new registries added to the SEER Program in 1992.

9. What other resources are used to prepare the CSR?

Cancer mortality data on all deaths occurring in the United States are obtained from the NCHS. The projections of the number of new cancer cases and cancer deaths in the United States are obtained from the American Cancer Society, and population data are obtained from the U.S. Census Bureau.

INTERPRETATION OF THE DATA IN THE CSR

10. What factors should be considered when interpreting the CSR data?

The statistics outlined in the CSR must be considered in light of changes in factors that can affect cancer incidence or patient survival. Examples include risk factors such as smoking, screening procedures such as mammography, diagnostic procedures for which there have been technological advances, and the introduction of new treatment regimens. There may be a time lag between the introduction of new treatments or technologies and their impact on cancer statistics.

11. What are the definitions of statistical terms used in the CSR?

- **Incidence**—the number of newly diagnosed cases for a specific cancer or for all cancers combined during a specific time period. When expressed as a rate, it is the number of new cases *per standard unit of population* during the time period. Incidence rates can be calculated based on a number of factors such as age, race, or sex.

Example: 9.0 cases of pancreatic cancer per 100,000 persons annually (all races, both sexes, for the period 1990–1994).

- **Mortality**—the number of deaths for a specific cancer or for all cancers combined during a specific time period. When expressed as a rate, the number of deaths during a specific time period are per 100,000 persons. Mortality rates can be calculated based on a number of factors such as age, race, or sex.

Example: 3.1 deaths from multiple myeloma per 100,000 persons annually (all races, both sexes, for the period 1990–1994).

- **Age-adjusted rate**—an incidence or mortality rate that has been adjusted to reduce the effects of differences in the age distributions of the populations being compared.

An age-adjusted rate is computed by weighting the age-specific rates in the population of interest by the proportions of persons in the corresponding age groups in a standard population, usually the 1970 U.S. population. In addition, some rates are presented adjusted to the world standard population, permitting comparisons of rates in SEER areas with those from other countries that have also published rates adjusted to the world standard.

Unless labeled "age-specific," all incidence and mortality rates in the CSR are age-adjusted rates.

- **Relative survival rate**—an estimate of the percentage of patients that would be expected to survive the effects of their cancer. This rate is calculated by adjusting the observed survival rate so that the effects of causes of death other than those related to the cancer in question are removed. (Observed survival is the actual percentage of patients still alive at some specified time after diagnosis of cancer. It considers deaths from all causes, cancer or otherwise.)
- **Percent change**—a measure of the change in incidence and mortality rates over a specified time interval. Percent changes are also provided for two 5-year periods.
- **Estimated Annual Percent Change (EAPC)**—a measure of the estimated yearly percent change in incidence and mortality rates over a specified time interval.
- **Person Years of Life Lost (PYLL)**—the sum of years of life lost by all persons in a population who died of a particular cancer. Actuarial (life-expectancy) tables are used to project the years of life that would have remained for persons who died of cancer at a particular age.

Example: In 1994, lung cancer had a PYLL of 2.23 million years for the United States (all races, both sexes).

- **Average Years of Life Lost (AYLL)**—the average years lost to a particular cancer among all persons who died of that cancer. It is calculated by dividing the PYLL for a particular cancer by the number of deaths from that cancer.

Example: In 1994, melanoma had an AYLL of 19.4 years for the United States (all races, both sexes).

- **Significance**—when comparing rates, statistical significance means differences between or among rates that are unlikely to have occurred merely by chance. For example, the probabilities that differences occurred by chance may be given as less than 1 in 10 (<0.10) or less than 1 in 20 (<0.05).
- **Standard error**—a measure of the variability associated with a reported cancer statistic.
- **Time trend**—the change in a cancer incidence or mortality rate (increasing, decreasing, or not changing) over time and the magnitude of that change.

FINDINGS IN THE CSR

12. What are the highlights of the CSR?

The CSR allows researchers and health professionals to quickly find up-to-date information regarding the incidence, mortality, and survival rates for all types of cancer. These data are presented together and are also broken down according to race, sex, and age. Data are also organized according to trends of incidence, mortality, and survival over time, providing accurate information about the historical course of cancer.

13. Can the CSR tell us anything about geographic patterns of cancer?

Yes, cancer mortality rates by state for all cancers combined and for specific cancers are presented in the CSR. Cancer incidence rates are also presented by SEER area for a recent time period.

In addition to the information in the CSR, NCI has been publishing a series of cancer atlases since 1975, containing color maps of U.S. mortality data that visually represent cancer patterns. Some examples of these volumes are the *Atlas of U.S. Cancer Mortality Among Whites, 1950–1980*, published in 1987, and the *Atlas of U.S. Cancer Mortality Among Nonwhites, 1950–1980*, published in 1990.

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Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1-800-4-CANCER (1-800-422-6237)

TTY (for deaf and hard of hearing callers): 1-800-332-8615

NCI Online***Internet***

Use <http://www.cancer.gov> to reach NCI's Web site.

CancerMail Service

To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

CancerFax® fax on demand service

Dial 301-402-5874 and listen to recorded instructions.

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